

5.1 Notes: Using Fundamental Identities

Reciprocal Identities			Quotient Identities	
$\sin\theta = \frac{1}{\csc\theta}$	$\cos\theta = \frac{1}{\sec\theta}$	$\tan\theta = \frac{1}{\cot\theta}$		$\tan\theta = \frac{\sin\theta}{\cos\theta}$
$\csc\theta = \frac{1}{\sin\theta}$	$\sec\theta = \frac{1}{\cos\theta}$	$\cot\theta = \frac{1}{\tan\theta}$		$\cot\theta = \frac{\cos\theta}{\sin\theta}$
Pythagorean Identities			\div by $\sin^2\theta$	
$\sin^2\theta + \cos^2\theta = 1$	$1 + \tan^2\theta = \sec^2\theta$	$1 + \cot^2\theta = \csc^2\theta$	$1 = \sec^2\theta - \tan^2\theta$	$1 = \csc^2\theta - \cot^2\theta$
$\sin^2\theta = 1 - \cos^2\theta$	$\tan^2\theta = \sec^2\theta - 1$			$\cot^2\theta = \csc^2\theta - 1$
$\cos^2\theta = 1 - \sin^2\theta$				

Simplifying a Trigonometric Expression

3. $\sin x \cos^2 x - \sin x$

$$\sin x (\cos^2 x - 1)$$

$$-\sin x (1 - \cos^2 x)$$

$$-\sin x (\sin^2 x)$$

$$-\sin^3 x$$

4. $\frac{\sec \theta}{\csc \theta}$

$$\frac{1}{\cos \theta}$$

$$\frac{1}{\sin \theta}$$

$$\frac{1}{\cos \theta} \cdot \frac{\sin \theta}{1}$$

$$\frac{\sin \theta}{\cos \theta}$$

$$\tan \theta$$

5. $\csc x - \cos x \cot x$

$$\frac{1}{\sin x} - \frac{\cos x}{1} \cdot \frac{\cos x}{\sin x}$$

$$\frac{1}{\sin x} - \frac{\cos^2 x}{\sin x}$$

$$\frac{1 - \cos^2 x}{\sin x}$$

$$\frac{\sin^2 x}{\sin x}$$

$$\sin x$$

6. $\frac{\csc \beta}{1 + \cot^2 \beta}$

$$\frac{\csc \beta}{\csc^2 \beta}$$

$$\frac{1}{\csc \beta}$$

$$\sin \beta$$

Factoring—Think of the trigonometric function as the variable.

7. $\cos^2 x - 1$

$$(\cos x + 1)(\cos x - 1)$$

8. $\sin^2 x - 4\sin x - 12$

$$(\sin x + 2)(\sin x - 6)$$

9. $\underline{\sec^2 x - \tan x - 3}$

$$(1 + \tan^2 x) - \tan x - 3$$

$$\tan^2 x - \tan x - 2$$

$$(\tan x - 2)(\tan x + 1)$$